FINAL DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,285,858 by Yoshida and in view of U.S. Patent Application No. US 2002/0128769 by Der Ghazarian et al, hereinafter Der Ghazarian in further view of U.S. Pat. No. 2003/0130013 by Kaegebein (priority date is 7/13/1999).

Regarding claim 1, Yoshida discloses a radio communications system (Fig. 2; Fig. 4) comprising:

a) an intrinsic pavement transmitter and antenna material (Fig. 2, 26; Fig. 4, 52) for conducting radio frequency signals (col. 3, lines 11-27);

b) a first transmitter/receiver, at a first point along the intrinsic pavement transmitter and antenna material (Figs. 2, 4: 30); and

c) a second transmitter/receiver (Figs. 2, 4: 16, 42, 44), at a second point along the intrinsic pavement transmitter and antenna material, and in communication with an end-user (e.g. driver of vehicle);

wherein the intrinsic pavement transmitter and antenna material conducts radio frequency signals between the first and second transmitter/receiver entirely within the pavement transmitter and antenna material (col. 2, line 40 – col. 3, line 27; col. 3, lines 50-61), and further wherein the only conductive coupling between the first transmitter/receiver and the second transmitter/receiver is the intrinsic pavement transmitter and antenna material (col. 3, lines 19-27 and lines 53-61).

Yoshida discloses the only conductive coupling between the first transmitter/receiver (Figs. 2, 4: 30) and the second transmitter/receiver (Figs. 2, 4: 16, 42, 44) is the intrinsic pavement transmitter and antenna material (Fig. 2, 26; Fig. 4, 52) (col. 3, lines 19-27 and lines 53-61). However, Yoshida does not disclose the first transmitter/receiver in communication with an end-user and a wireless intrinsic pavement transmitter and antenna material.

Kaegebein discloses a radio communications system (Fig. 1; Fig. 5) comprising:

a) a wireless intrinsic pavement transmitter and antenna material (Fig. 1, 10; Fig. 5, 10) for conducting radio frequency signals (section 0040; 0044);

b) a first transmitter/receiver (i.e. antenna; Fig. 1, 31; Fig. 5, 31), at a first point along the intrinsic pavement transmitter and antenna material (section 0040; 0044); and

c) a second transmitter/receiver (i.e. plurality of antenna assembly units; Fig. 1, 31; Fig. 5, 31), at a second point along the intrinsic pavement transmitter and antenna material (section 0040; 0044);

wherein the intrinsic pavement transmitter and antenna material conducts radio frequency signals between the first and second transmitter/receiver entirely within the pavement transmitter and

antenna material (section 0044; 0048-0050), and further wherein the only conductive coupling between the first transmitter/receiver and the second transmitter/receiver is the wireless intrinsic pavement transmitter and antenna material (section 0040; 0048-0050).

Again, Yoshida discloses the claimed system except Yoshida teaches wired coupling within the road between the antennas rather than a wireless intrinsic pavement transmitter and antenna material that wirelessly couples the antennas. However, the claimed feature of a wireless intrinsic pavement transmitter and antenna material was old and well know in the art. Kaegebein clearly teaches such concept. Thus, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Yoshida to include a wireless intrinsic pavement transmitter and antenna material as taught by Kaegebein. In other words, one of ordinary skill in the art would have been lead to make such a modification of Yoshida to wirelessly couple the antennas, such as the wireless coupling of antennas of Kaegebein, to the road of Yoshida so the first transmitter/receiver and second transmitter/receiver of Yoshida can wirelessly communicate only using the road to exchange radio signals.

However, Yoshida in view of Kaegebein do not disclose the first transmitter/receiver in communication with an end-user

Der Ghazarian discloses an Electronic Vehicle Monitoring System comprising:
a) a RF electromagnetic Transceiver unit (see Figure 2, 30; page 5, section 0058, lines 18-21); a first transmitter/receiver or parking space transceiver unit (Figure 2, 22), at a first point along a parking space, and in communication with an end-user or employee of a vehicle dealership using computer (page 1, section 0003, lines 1-18; Figure 2, 21); and

c) a second transmitter/receiver or vehicle transceiver unit (Figure 2, 23), at a second point along the parking space, and in communication with an end-user or driver of the vehicle (page 4, section 0040, lines 1-21);

wherein the RF electromagnetic Transceiver unit conducts radio frequency signals between the first and second transmitter/receiver (page 5, section 0058, lines 18-21; page 6, section 0060, line 1 – section 0064, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Yoshida Kaegebein to include a first transmitter/receiver in communication with an end-user as taught by Der Ghazarian. One of ordinary skill in the art would have been lead to make such a modification to provide an end-user to operate the first transmitter/receiver and provide communication between two end-users via radio frequency signals through a wireless intrinsic pavement transmitter and antenna.

Regarding claim 2, the radio communications system of claim 1, wherein Yoshida discloses the second transmitter/receiver (e.g. antenna) is coupled to the end-user with a hard wire (e.g. on-board unit) (col. 3, lines 11-16).

Regarding claim 3, the radio communications system of claim 1, wherein Yoshida in view of Kaegebein discloses the second transmitter/receiver is a conductive surface portion of the intrinsic pavement transmitter and antenna material (Yoshida: col. 3, lines 11-21; Kaegebein: section 0040; 0044).

Regarding claim 4, the radio communications system of claim 1, wherein Yoshida in view of Kaegebein discloses the first transmitter/receiver is adjacent to the intrinsic pavement

transmitter and antenna material (Yoshida: col. 2, line 65 – col. 3, line 2; col. 3, lines 53-61; Figs. 2, 4: 30; Kaegebein: Fig. 1, 31; Fig. 5, 31; section 0040).

Regarding claim 5, the radio communications system of claim 1, wherein Yoshida discloses the first transmitter/receiver is located in the intrinsic pavement transmitter and antenna material (col. 1, lines 55-67; col. 2, line 65 – col. 3, line 2; col. 3, lines 53-61; Figs. 2, 4: 30).

4. Claims 6, 7, and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida and in view of Kaegebein.

Regarding claim 6, Yoshida discloses an intrinsic pavement transmitter and antenna material, comprising a roadway (Fig. 3, 24), including:

a) a suitable wearing course material (e.g. road surface); and

b) an effective amount of radio frequency conductive material (Fig. 5, 52'), sufficient to conduct radio frequency signals,

between at least two locations within the pavement (Fig. 4, 52; Fig. 4, 30),

such that the radio frequency signals are conducted entirely within the pavement transmitter and antenna material (col. 3, line 11 – col. 4, line 27), and wherein the only conductive coupling between the at least two locations within the pavement is the intrinsic pavement transmitter and antenna material (col. 3, lines 19-27 and lines 53-61).

Yoshida clearly discloses the only conductive coupling between the first transmitter/receiver (Figs. 2, 4: 30) and the second transmitter/receiver (Figs. 2, 4: 16, 42, 44) is the intrinsic pavement transmitter and antenna (Fig. 2, 26; Fig. 4, 52) (col. 3, lines 19-27 and lines 53-61). However, Yoshida does not disclose a wireless intrinsic pavement transmitter and antenna material.

Kaegebein discloses a wireless intrinsic pavement transmitter and antenna material, comprising (Fig. 1; Fig. 5), including:

an effective amount of radio frequency conductive material (Fig. 1: 10, 21, 22), sufficient to conduct radio frequency signals (section 0040),

between at least two locations within the pavement (i.e. plurality of antenna assembly units; Fig. 1, 31; Fig. 5, 31; section 0040; 0048-0050),

such that the radio frequency signals are conducted entirely within the pavement transmitter and antenna material (section 0044; 0048-0050), and wherein the only conductive coupling between the at least two locations within the pavement is the wireless intrinsic pavement transmitter and antenna material (section 0040; 0048-0050).

Again, Yoshida discloses the claimed material except Yoshida teaches wired coupling within the road between the antennas rather than a wireless intrinsic pavement transmitter and antenna material that wirelessly couples the antennas. However, the claimed feature of a wireless intrinsic pavement transmitter and antenna material was old and well know in the art. Kaegebein clearly teaches such concept. Thus, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the material of Yoshida to include a wireless intrinsic pavement transmitter and antenna material as taught by Kaegebein. In other words, one of ordinary skill in the art would have been lead to make such a modification of Yoshida to wirelessly couple the antennas, such as the wireless coupling of antennas of Kaegebein, to the road of Yoshida so the first transmitter/receiver and second transmitter/receiver of Yoshida can wirelessly communicate only using the road to exchange radio signals.

Regarding claim 7, the wireless intrinsic pavement transmitter and antenna material of claim 6, wherein Yoshida discloses the radio frequency conductive material is at least one member selected from a group consisting of: radio frequency transmittable polymers, metal shavings, metal dust, and conductive carbons (col. 3, line 52 – col. 4, line 27).

Regarding claim 10, the wireless intrinsic pavement transmitter and antenna material of claim 7, wherein Yoshida discloses the metal shavings are at least one member selected from a group consisting of: iron, iron alloys, aluminum, aluminum alloys, copper, and copper alloys (col. 3, line 62 – col. 4, line 18).

Regarding claim 11, the wireless intrinsic pavement transmitter and antenna material of claim 7, wherein Yoshida discloses the metal dust is at least one member selected from a group consisting of: iron, iron alloys, aluminum, aluminum alloys, copper, and copper alloys (col. 3, line 62 – col. 4, line 18).

Regarding claim 12, the wireless intrinsic pavement transmitter and antenna material of claim 6, wherein Yoshida discloses the suitable wearing course material (e.g. road surface) is at least one member selected from a group inherently consisting of: asphalt and concrete (Fig. 3, 24; col. 1, lines 55-60).

Regarding claim 13, the wireless intrinsic pavement transmitter and antenna material of claim 6, wherein Yoshida discloses the conductive material is intermixed with the wearing course material (Fig. 3, 24; Fig. 4, 52; col. 1, lines 55-60; col. 3, line 61 – col. 4, line 27).

Regarding claim 14, the wireless intrinsic pavement transmitter and antenna material of claim 6, wherein Yoshida discloses the conductive material and the wearing course material are

substantially distinct layers (Fig. 3, 24; Fig. 4, 52; col. 1, lines 55-60; col. 3, line 61 – col. 4, line 27).

Regarding claim 15, the wireless intrinsic pavement transmitter and antenna material of claim 6, wherein Yoshida discloses an insulating layer proximate the roadway (Fig. 4, 52).

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida in view of Kaegebein, as applied to claim 6 above, and in further view of U.S. Patent No. 3,962,142 by Freeman et al, hereinafter Freeman.

Regarding claim 8, the wireless intrinsic pavement transmitter and antenna material of claim 6, wherein Yoshida discloses a radio frequency conductive material (col. 3, line 62 – col. 4, line 27).

However, Yoshida in view of Kaegebein do not disclose (a) the conductive carbon is at least one member selected from a group consisting of carbon black, carbon fiber, graphite and coke breeze.

Freeman discloses electrically conducting concrete (see Abstract) comprising: a settable composition for use as a structural material comprising a bonding material and an aggregate, wherein said aggregate contains electrically conducting material comprising a quantity of relatively large electrically conductive particulate material and a quantity of relatively small electrically conductive particulate material (column 1, lines 46-55). Wherein (a) the conductive carbon is at least one member selected from a group consisting of carbon black, carbon fiber, graphite and coke breeze (see Examples 1-7 in columns 3-4); (b) the suitable wearing course material is at least one member selected from a group consisting of: asphalt and concrete

(column 7, lines 52-66); and (c) the conductive material is intermixed with the wearing course material (column 7, lines 52-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the wireless intrinsic pavement transmitter and antenna material of Yoshida in view of Kaegebein to include conductive carbon as taught by Freeman. One of ordinary skill in the art would have been lead to make such a modification since the conductive carbon will provide an electrically conducting roadway.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida in view of Kaegebein, as applied to claim 7 above, and in further view of U.S. Patent No. 5,460,649 by Strassman.

Regarding claim 9, the wireless intrinsic pavement transmitter and antenna material of claim 7, wherein Yoshida discloses a protective resin film is used to cover the outer tube (Fig. 4, 56; col. 3, line 62 – col. 4, line 18).

However, Yoshida in view of Kaegebein do not disclose the radio frequency transmittable polymers include: polyacetylene, polyaniline, polypyrrole, polythiophenes, polyethylenedioxythiophene and poly(p-phenylene vinylene)s.

Strassman discloses a fiber-reinforced rubber asphalt composition (see Abstract) comprising: composition that is more durable, longer lasting, more resilient, and less prone to cracking. Wherein fibrous materials employed in the composition are preferably synthetic organic fibers. Examples of suitable polyester fibers include: poly(ethylene terephthalate), poly(1,4-cyclohexanemethylene terephthalate), poly(vinyl acetate), poly(methyl acrylate), poly

(methyl methacrylate), and poly(hexamethylene fumarate) (column 2, lines 52-64; column 5, line 61 – column 6, line 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the wireless intrinsic pavement transmitter and antenna material of Yoshida in view of Kaegebein to include radio frequency transmittable polymers as taught by Strassman. One of ordinary skill in the art would have been lead to make such a modification since a fiber-reinforced rubber asphalt composition will provide an electrically conducting roadway.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892 Form.

9. Any response to this action should be mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Or faxed to:

(571) 273-8300 (for formal communications intended for entry)

Or call:

(571) 272-2600 (for customer service assistance)

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LISA HASHEM whose telephone number is (571)272-7542. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on (571) 272-7547. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-2600.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Fan Tsang/
Supervisory Patent Examiner, Art Unit 2614

/Lisa Hashem/
Examiner, Art Unit 2614
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